Laravel Installation

Getting Started with Laravel (Linux/WSL2/Mac)

⚠️ WSL2 Warning: Run `dos2unix` command before running any scripts.

Prerequisites

What You Need:

- ✅ **PHP 8.2+** (you should already have this)
- ✅ **MySQL** (you should already have this)
- ✅ **Composer** (PHP package manager)
- ✅ **Web server** (built-in PHP server works)

Run the script to Check/Install Automatically

You can manually check and set the applications (Module 1), but you can also run scripts to automate the process.

For Linux/WSL2

```
bash wsl2_install
```

For Mac

```
bash mac_install
```

Set the MySQL root Password

For the rest of this module, we use the root password as '123456', so I recommend that you change the MySQL root password to facilitate the process.

```
if [[ "$OSTYPE" == "darwin"* ]]; then
  MYSQL="mysql"
else
  MYSQL="sudo mysql"
fi
$MYSQL -u root -p << EOF
ALTER USER 'root'@'localhost' IDENTIFIED BY '123456';
FLUSH PRIVILEGES;
EOF
```

Or, run the `mysql_root_password.sh` script to automate this process.

```
bash mysql_root_password.sh
```

Create the MySQL Database for Laravel

```
# Create database and user
if [[ "$OSTYPE" == "darwin"* ]]; then
  MYSQL="mysql"
else
  MYSQL="sudo mysql"
fi

$MYSQL -u root -p << EOF
CREATE DATABASE IF NOT EXISTS $DB_NAME;
CREATE USER IF NOT EXISTS '$DB_USER'@'localhost' IDENTIFIED BY '$DB_PASSWORD';
GRANT ALL PRIVILEGES ON $DB_NAME.* TO '$DB_USER'@'localhost';
FLUSH PRIVILEGES;
EOF
```

Or, run the `mysql_user.sh` script to automate this process..

```
bash mysql_user.sh
```

Create the MySQL Database for Laravel

```
# Create database and user
if [[ "$OSTYPE" == "darwin"* ]]; then
  MYSQL="mysql"
else
  MYSQL="sudo mysql"
fi

$MYSQL -u root -p << EOF
CREATE DATABASE IF NOT EXISTS $DB_NAME;
CREATE USER IF NOT EXISTS '$DB_USER'@'localhost' IDENTIFIED BY '$DB_PASSWORD';
GRANT ALL PRIVILEGES ON $DB_NAME.* TO '$DB_USER'@'localhost';
FLUSH PRIVILEGES;
EOF
```

Run the `mysql_user.sh` script.

```
bash mysql_user.sh
```

⚠️ WSL2 Setup (Only for WSL2 Users)

Copy the wslconfig file as C:\Users<user>.wslconfig, for example `c:\Users\smcho\.wslconfig` :

```
[wsl2]
networkingMode=mirrored
```

Or, run the `make_wslconfig.sh` script to automate this process..

```
bash make_wslconfig.sh
```

⚠️ For WSL2 users, add `--host=0.0.0.0` option so your Windows OS can access the WSL2 server.

```
php artisan serve --host=0.0.0.0 --port=8000
```

How the Installer Script Works (Manual Install)

You can use the following content to install the required tools manually. Otherwise, skip to the next section, "Creating Your First Laravel Project".

Check if PHP is installed

```
$ which php
/usr/bin/php
$ php -v
PHP 8.4.12 (cli) (built: Aug 29 2025 06:47:47) (NTS)
Copyright (c) The PHP Group
```

Install PHP

```
sudo apt update && sudo apt upgrade -y
```

```
sudo apt install -y php php-cli php-fpm php-json \
php-common php-mysql php-zip php-gd php-mbstring \
php-curl php-xml php-pear php-bcmath php-sqlite3
```

Install Composer

Linux (WSL2):

```
curl -sS https://getcomposer.org/installer | php
sudo mv composer.phar /usr/local/bin/composer
```

macOS:

```
brew install composer
```

Check Your Setup:

```
php --version         # Should be 8.2+
composer --version    # Should be installed
mysql --version       # Should be installed
```

```
$ php --version
PHP 8.4.12 (cli) (built: Aug 29 2025 06:47:47) (NTS)
Copyright (c) The PHP Group
Built by Debian
Zend Engine v4.4.12, Copyright (c) Zend Technologies
    with Zend OPcache v8.4.12, Copyright (c), by Zend Technologies

$ composer --version
Composer version 2.8.11 2025-08-21 11:29:39
PHP version 8.4.12 (/usr/bin/php8.4)
Run the "diagnose" command to get more detailed diagnostics output.

$ mysql --version
mysql  Ver 8.0.43-0ubuntu0.22.04.1 for Linux on x86_64 ((Ubuntu))
```

Check if MySQL is running:

```
# Linux/WSL2
$ sudo netstat -tlnp | grep 3306

tcp        0      0 127.0.0.1:33060         0.0.0.0:*               LISTEN      18508/mysqld
tcp        0      0 127.0.0.1:3306          0.0.0.0:*               LISTEN      18508/mysqld

# Mac
$ lsof -nP -iTCP:3306 -sTCP:LISTEN
COMMAND  PID  USER   FD   TYPE             DEVICE SIZE/OFF NODE NAME
mysqld  2864 chos5   31u  IPv4 0x129757e677649a20      0t0  TCP 127.0.0.1:3306 (LISTEN)
```

If MySQL is not running, start the MySQL server

```
# Linux/WSL2
$ sudo systemctl start mysql
# Command to stop
# sudo systemctl stop mysql

# Mac
brew services start mysql
# This will start the MySQL server as a background service,
# making it automatically restart at login
# Alternatively, if you want to start MySQL just for the current session
# (without running as a service), you can use:
mysql.server start
# This starts MySQL for the current terminal session and will not restart automatically after reboot
```

In case you need to install MySQL on Linux/WSL2

```
sudo apt update && sudo apt upgrade -y
```

MySQL

```
sudo apt install mysql-client-core-8.0 -y
sudo apt install mysql-server -y
```

Creating Your First Laravel Project

Using Composer

```
composer create-project laravel/laravel student-api
cd student-api
```

This creates a complete Laravel application!

Starting the Development Server

```
cd student-api
php artisan serve

For WSL2

php artisan serve --host:0.0.0.0
```

Default URLs:

- **Web**: http://localhost:8000

You should see:

"Laravel" welcome page - Your installation is successful!

Laravel Project Structure

```
student-api/
├── app/                        # Your application code
│   ├── Http/Controllers/   # Controllers (MVC) **
│   ├── Models/              # Models
│   └── ...
├── routes/                  # URL routing
│   ├── web.php             # Web routes
│   └── api.php             # API routes
├── database/                # Database files
│   ├── migrations/       # Database structure
│   └── seeders/          # Sample data
├── resources
│   ├── css
│   ├── js
│   └── views/           # Views
└── config/              # Configuration files
```

Key Directories Explained

`/app` - Your Code Lives Here

```
app/
├── Http/Controllers/    # Handle requests (Controller in MVC)
├── Models/              # Data models (Model in MVC)
├── Providers/           # Service providers
└── Exceptions/          # Error handling
```

Notice the **Controller & Model** in this directory.

`/routes` - Define URLs

```
routes/
├── web.php              # Website routes
├── api.php              # API routes (we'll use this!)
└── console.php          # Command line routes
```

`/resources/views/` - Views

```
resources/
├── css
├── js
└── views/            # Views (MVC) **
```

Notice the **View** (MVC) in this directory.

Database Directory

```
database/
├── migrations/          # Database schema
│   └── create_users_table.php
├── seeders/             # Sample data
│   └── DatabaseSeeder.php
└── factories/           # Test data generators
    └── UserFactory.php
```

The `migrations` in Laravel mean database schema.

Laravel manages your database structure with code!

Configuration Files

```
config/
├── app.php              # App settings
├── database.php         # DB connections
├── cors.php             # API CORS settings
└── ...
```

Environment File (.env)

The .env file

- Holds environment-specific configuration.
- Keeps sensitive or changing values outside of code.

Never commit .env to version control!

The .gitignore has .env to avoid submission to Git/GitHub.

App Name & URL

```
APP_NAME=StudentAPI
APP_URL=http://localhost:8000
```

You need to change the APP_URL accordingly when you deploy your Laravel app.

App Key

```
APP_KEY=base64:NwcY4CY+mxgz6MvDWukdkzSeUJwHpDtJ5w6pHeEc/co=
```

- It’s a secret cryptographic key used by Laravel, generated by this command.
- Laravel 12.x or later automatically generates APP_KEY, but if you use an old version, you need to run this command.

```
php artisan key:generate --force
```

- Required for:
    - Encrypting / Decrypting data (Crypt::encrypt(), Crypt::decrypt()).
    - Signing session and cookie data so they can’t be tampered with.
- Without a valid APP_KEY, encrypted data becomes unreadable.

Database

This section describes the database used by Laravel.

By default, Laravel uses `SQLite`.

```
DB_CONNECTION=sqlite
# DB_HOST=127.0.0.1
# DB_PORT=3306
# DB_DATABASE=laravel
# DB_USERNAME=root
# DB_PASSWORD=
```

We use MySQL, not SQLite, so we need to change the database configuration.

```
DB_CONNECTION=mysql
DB_HOST=127.0.0.1
DB_PORT=3306
DB_DATABASE=laravel_app
DB_USERNAME=laravel_user
DB_PASSWORD=password123
```

Composer file (composer.json)

The `composer.json` file is the heart of dependency management in Laravel; It tells Composer (PHP's package manager) what libraries and configurations your project needs.

Purpose

- Defines **dependencies** (Laravel framework, third-party packages).
- Configures **autoloading** for classes.
- Declares **project metadata** (name, description, license).
- Controls **scripts** for automation (e.g., clearing cache, running tests).

Key Sections

1. **require**

- Lists mandatory PHP packages
- Example:

```
"require": {
    "php": "^8.2",
    "laravel/framework": "^12.0",
    "laravel/tinker": "^2.10.1"
},
```

2. **require-dev**

- Packages only for development/testing
- Example:

```
"require-dev": {
    "fakerphp/faker": "^1.23",
    "laravel/pail": "^1.2.2",
    "laravel/pint": "^1.24",
    "laravel/sail": "^1.41",
    "mockery/mockery": "^1.6",
    "nunomaduro/collision": "^8.6",
    "phpunit/phpunit": "^11.5.3"
}
```

3. **autoload/autoload-dev**

- Defines how PHP classes are loaded
- Example:

```
"autoload": {
    "psr-4": {
        "App\\": "app/",
        "Database\\Factories\\": "database/factories/",
        "Database\\Seeders\\": "database/seeders/"
    }
},
"autoload-dev": {
    "psr-4": {
        "Tests\\": "tests/"
    }
},
```

This tells Composer that the namespace App\ maps to the app/ directory.

4. **scripts**

- Automates tasks via Composer commands
- Example:

```
"scripts": {
    "post-autoload-dump": [
        "Illuminate\\Foundation\\ComposerScripts::postAutoloadDump",
        "@php artisan package:discover --ansi"
    ],
    "test": [
        "@php artisan config:clear --ansi",
        "@php artisan test"
    ]
}
```

5. **extra**

- Holds extra configuration for Laravel or packages
- Example:

```
"extra": {
  "laravel": {
    "dont-discover": []
  }
}
```

Composer Workflow

1. Edit composer.json (add/remove packages).
2. Run:

```
composer install     # Install dependencies
composer update      # Update dependencies
```

3. Composer generates composer.lock to lock exact versions.

Run Laravel Server with Different Port

In the Laravel project, we can start the server.

```
php artisan serve
php artisan serve --port=8080

#WLS2

php artisan serve --host=0.0.0.0 --port=8080
```

Change port number in the .env

You can change the .env file to change the port number.

```
APP_URL=http://localhost:8080 # Change your port
```

Then clear the cache:

```
php artisan config:cache
```

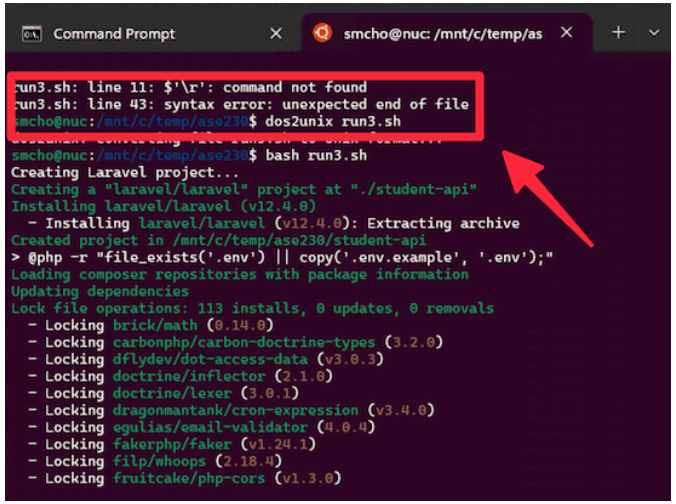
However, it only affects how URLs are generated by Laravel internally (like URL helpers and redirects), but it does not change the port the built-in PHP server listens on when you run the server.

Copy and run the corresponding script in the code directory

⚠️ WSL2: dos2unix

- You may have an error "'\r' command not found" if you run scripts on WSL2.
- ⚠️ Run `dos2unix` command to remove this error.

```
# install the package if necessary
# sudo apt install dos2unix
dos2unix run2-2.sh
```



Run the script

Copy the run2-2.sh from the corresponding code directory in your exercise directory (for example, ~/temp/ase456).

```
# in the temp/ase230 directory (for example)
bash run2-2.sh # run script
cd student-api
php artisan serve
# WSL2
php artisan serve --host=0.0.0.0
# Access <http://localhost:8080>
```

Artisan - Laravel's Command Tool

In the Laravel project, an `artisan` PHP script is used to access and manipulate the Laravel project.

```
php artisan about # Show Laravel's self-awareness
php artisan route:list        # See all routes
```

Tinker Interactive exploration Tool

We can use Tinker to check the Laravel project interactively.

```
php artisan tinker
```

Inside the tinker:

```
File::exists(base_path('composer.json')) # Check if file exists
File::get(base_path('README.md'))        # Read any file
```